

CLAIMS

1. An aqueous regenerator for addition to an aqueous developer that includes an organic solvent, a dispersing agent and a weak base, and has a pH between about 8 and less than about 13, the regenerator comprising an organic solvent, a dispersing agent, and an effective amount of at least one strong base such that the regenerator has a pH greater than the pH of the developer.
2. The regenerator of claim 1 comprising an effective amount of the strong base such that the regenerator has a pH of about 10 or greater.
3. The regenerator of claim 1 comprising an effective amount of the strong base such that the regenerator has a pH of about 11 or greater.
4. The regenerator of claim 1 comprising an effective amount of the strong base such that the regenerator has a pH of about 12 or greater.
5. The regenerator of claim 1 wherein the regenerator has a greater conductivity than the developer.
6. The regenerator of claim 1 wherein the organic solvent comprises an alcohol.
7. The regenerator of claim 1 wherein the organic solvent comprises benzyl alcohol, a phenoxyethanol, a phenoxypropanol, or combinations or derivatives thereof.
8. The regenerator of claim 1 wherein the organic solvent comprises esters of ethylene glycol or propylene glycol with acids containing alkyl groups of C₁₋₆ or ethers of ethylene glycol, diethylene glycol or propylene glycol containing alkyl groups of C₁₋₆.
9. The regenerator of claim 1 wherein the organic solvent comprises 2-(2-ethoxyethoxy)ethanol.
10. The regenerator of claim 1 comprising between about 1 and about 12 weight percent organic solvent.

11. The regenerator of claim 1 comprising between about 3 and about 6 weight percent organic solvent.
12. The regenerator of claim 1 wherein the strong base has a K_b of about 1 or greater.
13. The regenerator of claim 1 comprising between about 0.1 and about 5.0 weight percent strong base.
14. The regenerator of claim 1 wherein the strong base comprises a hydroxide.
15. The regenerator of claim 1 wherein the strong base comprises a metal hydroxide.
16. The regenerator of claim 1 wherein the strong base comprises sodium, lithium or potassium hydroxide.
17. The regenerator of claim 1 wherein the regenerator comprises a plurality of strong bases.
18. The regenerator of claim 1 comprising a total of between about 4 and about 20 weight percent dispersing agent.
19. The regenerator of claim 1 comprising a total of between about 7 and about 15 weight percent dispersing agent.
20. The regenerator of claim 1 comprising a plurality of dispersing agents.
21. The regenerator of claim 1 wherein the dispersing agent comprises a surfactant.
22. The regenerator of claim 1 wherein the dispersing agent comprises an anionic, cationic, nonionic, or amphoteric surfactant or a combination thereof.

23. The regenerator of claim 1 wherein the dispersing agent comprises an organic sulfate or sulfonate.

24. The regenerator of claim 1 wherein the dispersing agent comprises an alkali metal alkyl sulfate, an alkali metal alkylnaphthalenesulfonate, or an alkali metal alkylbenzene sulfonate.

25. The regenerator of claim 1 wherein the dispersing agent comprises sodium octyl sulfate, sodium methylnaphthalenesulfonate, sodium xylene sulfonate, sodium toluene sulfonate, or a combination thereof.

26. The regenerator of claim 1 wherein the dispersing agent comprises polyvinyl alcohol or polyvinyl pyrrolidone.

27. The regenerator of claim 1 further comprising a weak base.

28. The regenerator of claim 27 wherein the weak base has a K_b of between about 1×10^{-2} to about 1×10^{-5} .

29. The regenerator of claim 27 comprising between about 0.1 and about 5 weight percent weak base.

30. The regenerator of claim 27 wherein the weak base comprises an amine.

31. The regenerator of claim 27 wherein the weak base comprises monoethanolamine, diethanolamine, triethanolamine or combinations or derivatives thereof.

32. The regenerator of claim 27 wherein the weak base comprises sodium carbonate, potassium carbonate, sodium bicarbonate, potassium bicarbonate, trisodium phosphate, tripotassium phosphate or combinations or derivatives thereof.

33. The regenerator of claim 1 further comprising, a thickener, a conditioner, a preservative, a chelating agent, an anti-foaming agent, or combinations thereof.

34. The regenerator of claim 1 wherein the pH of the regenerator is at least 0.5 higher than the pH of the developer to which it is to be added.

35. The regenerator of claim 1 wherein the pH of the regenerator is at least 0.7 higher than the pH of the developer to which it is to be added.

36. The regenerator of claim 1 wherein the pH of the regenerator is at least 1.0 higher than the pH of the developer to which it is to be added.

37. A developer system for preparing printing plates comprising:

a developer unit containing an aqueous developer that includes an organic solvent, a weak base and a dispersing agent, and having a pH between about 8 and less than about 13, wherein the developer unit is adapted to contact printing plate precursors with the developer;

a regenerator unit containing an aqueous regenerator for addition to the developer, the regenerator comprising an organic solvent, a dispersing agent, and an effective amount of at least one strong base such that the regenerator has a greater pH than the developer, wherein the regenerator unit is adapted to controllably deliver an effective amount of the regenerator to the developer unit to maintain the activity of the developer.

38. A method for treating an aqueous developer after developing at least a portion of one printing plate precursor, the developer comprising an organic solvent, a dispersing agent and a weak base, and having a pH between about 8 and less than about 13, the method comprising:

adding to the developer an effective amount of an aqueous regenerator to maintain the activity of the developer, the regenerator comprising an organic solvent, a dispersing agent, and an effective amount of at least one strong base such that the regenerator has a greater pH than the developer.

39. The method of claim 38 comprising adding an effective amount of the regenerator to maintain the pH of the developer.
40. The method of claim 38 wherein the adding step comprises maintaining the pH of the developer at between about 8 and about 12.
41. The method of claim 38 wherein the adding step comprises maintaining the pH of the developer at between about 9 and about 11.
42. The method of claim 38 wherein the adding step comprises maintaining the pH of the developer at between about 9.5 and about 10.5.
43. The method of claim 38 comprising adding an effective amount of the regenerator to maintain the organic solvent concentration of the developer.
44. The method of claim 38 wherein the adding step comprises maintaining the organic solvent concentration of the developer at between about 2 and about 8 weight percent.
45. The method of claim 38 wherein the adding step comprises maintaining the organic solvent concentration of the developer at between about 3 and about 6 weight percent.
46. The method of claim 38 comprising adding an effective amount of the regenerator to maintain the dispersing agent concentration of the developer.
47. The method of claim 38 wherein the adding step comprises maintaining a total dispersing agent concentration at between about 7 and about 15 weight percent dispersing agent.
48. The method of claim 38 comprising adding an effective amount of the regenerator to maintain the conductivity of the developer.

49. The method of claim 38 comprising adding an effective amount of replenisher and regenerator to maintain the activity of the developer.

50. A method for developing a plurality of imaged printing plate precursors, the method comprising:

contacting a portion of at least one imaged printing plate precursor with an aqueous developer comprising an organic solvent, a dispersing agent and a weak base, and having a pH between about 8 and less than about 13;

adding to the developer an effective amount of an aqueous regenerator to maintain the activity of the developer, the regenerator comprising an organic solvent, a dispersing agent, and an effective amount of at least one strong base such that the pH of the regenerator is greater than the pH of the developer; and

after adding the regenerator, contacting a portion of at least one additional imaged printing plate precursor with the developer.

51. The method of claim 50 wherein the printing plate precursor comprises a radiation-sensitive composition applied onto a substrate.

52. The method of claim 51 wherein the radiation-sensitive composition is laser imageable.

53. The method of claim 51 wherein the radiation-sensitive composition comprises a polymeric material.

54. The method of claim 53 wherein the polymeric material comprises an acidic or weakly basic functionality.

55. The method of claim 53 wherein the polymeric material comprises a carboxylic acid moiety.

56. The method of claim 53 wherein the polymeric material comprises an acrylic acid polymer, methacrylic acid polymer or a combination, derivative or copolymer thereof.
57. The method of claim 53 wherein the polymeric material comprises a phenolic resin.
58. The method of claim 52 wherein the radiation-sensitive composition comprises an infrared absorbing component.
59. The method of claim 52 wherein the radiation-sensitive composition comprises a plurality of layers applied onto the substrate.
60. The method of claim 52 wherein the radiation-sensitive composition comprises a first layer applied onto the substrate that is soluble in the aqueous developer.
61. The method of claim 60 wherein the first layer comprises an acidic moiety.
62. The method of claim 60 wherein the radiation-sensitive composition comprises a second layer applied onto the first layer, the second layer comprising a polymeric material that is not soluble in the aqueous developer.
63. The method of claim 62 wherein the second layer comprises a phenolic resin.
64. The method of claim 50 wherein the at least one imaged printing plate precursor changes the activity of the developer upon contacting the developer.
65. The method of claim 50 comprising repeating the contacting and adding steps a plurality of times.
66. A method of forming a plurality of printing plates comprising
providing a plurality of printing plate precursors, each precursor comprising a radiation-sensitive composition applied onto a substrate;

imagewise exposing the precursors to radiation to form a plurality of imaged printing plate precursors;

contacting a portion of at least one of the imaged printing plate precursors with an aqueous developer to form a printing plate, wherein the developer comprises an organic solvent, a dispersing agent, and a weak base, and has a pH between about 8 and less than about 13;

adding to the developer an effective amount of an aqueous regenerator to maintain the activity of the developer, the regenerator comprising an organic solvent, a dispersing agent, and an effective amount of at least one strong base such that the pH of the regenerator is greater than the pH of the developer; and

after adding the regenerator, contacting a portion of at least one additional imaged printing plate precursor with the developer to form a printing plate.

67. The method of claim 66 wherein the imagewise exposing step comprises imagewise exposing the radiation-sensitive composition with a laser.

68. A method of forming a plurality of printing plates comprising providing a plurality of printing plate precursors, each precursor comprising a radiation-sensitive composition applied onto a substrate;

imagewise exposing the precursors to radiation using stochastic screening to form a plurality of imaged printing plate precursors;

contacting a portion of at least one of the imaged printing plate precursors with an aqueous developer to form a printing plate, wherein the developer comprises an organic solvent, a dispersing agent, and a weak base, and has a pH between about 8 and less than about 13;

adding to the developer an effective amount of an aqueous regenerator to maintain the activity of the developer, the regenerator comprising an organic solvent, a

dispersing agent, and an effective amount of at least one strong base such that the pH of the regenerator is greater than the pH of the developer; and

after adding the regenerator, contacting a portion of at least one additional imaged printing plate precursor with the developer to form a printing plate.

69. The method of claim 68 wherein the stochastic screening comprises first order stochastic screening.

70. The method of claim 68 wherein the stochastic screening comprises second order stochastic screening.

71. The method of claim 68 wherein the stochastic screening comprises a hybrid screening.